

# UNIVERSITY OF CALIFORNIA.

## AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 17.

[In order to render the results of investigations and experiments conducted by the Agricultural Department of the University of California more quickly and more generally available than has heretofore been done through the annual or biennial reports, it is proposed to embody hereafter, in the form of "Bulletins," to be issued as often as may seem desirable, reports of results, as well as such other discussions, information or answers to questions as may be of general interest. It is intended to make these bulletins, as a rule, short enough for insertion in the daily or weekly papers of the State, and proof-slips of the same will be regularly mailed to papers applying therefor. The substance of these bulletins will ultimately be embodied in a more complete and connected form, in the annual reports of the College of Agriculture.]

### The Muscat Grape on the Southern Mesas.

Much has been said and written of late concerning the failure of the muscat grape on the mesa lands of southern California. The facts as mostly stated are that the vine seems to do well for from three to five years, or even more, bearing perhaps two or three good crops, but after that will fail to yield well, if at all. Few details in regard to the exact nature of this failure have been publicly given. In some cases it is stated that the fruit fails to set; in others it would be inferred that the vine even failed to bloom in sufficient abundance; and again, the statements would lead to the understanding that the general growth was feeble. Until the precise nature of the "failure" is defined it will be difficult to come to any accurate conclusion as to the cause and the possible remedy of the trouble. In the mean time the conclusion leaned to by most persons seems to be that the mesas are too dry, and that therefore the muscat must be placed within reach of irrigation. It is quite certain that if the mesa lands are too dry for the muscat there is no grape variety that will do better on these soils. The conclusion, viz., that the wide expanse of such lands, from Santa Barbara to San Diego, is useless for grape culture, is a rather serious one, and cannot be willingly accepted by our people without the most definite proof that it is the want of moisture, and not that of some other condition, that stands in the way of success.

The mere fact that the grape does well on the lands at the foot of the mesas on which it fails, is altogether inconclusive. For the valley soils differ from those of the adjacent mesas in a number of points beside the matter of moisture, such as the following: Greater retentiveness and usually, greater compactness and fineness of texture; a larger proportion of

alkalies (potash and soda), also of phosphoric acid and of humus; the latter implying the important condition of a relatively greater proportion of nitrogen in the valley soils.

As to the alkalies, they are so abundantly present in all the mesa soils thus far examined, that a deficiency in this respect cannot be thought of as the cause of the reported failures. It is quite otherwise with respect to the supply of phosphates and of humus, correlatively of nitrogen. These are naturally small, approaching to deficiency, in most mesa soils, and often decrease very rapidly as we descend from the surface soil to the subsoil. Since, on account of the dryness of the surface soil in summer, the vine must draw chiefly upon the subsoil for the substance of the forming grape, it is at least quite possible that after exhausting the small supply of the needful substances within reach of the deeper roots by the production of two or three crops, the plant finds itself unable to obtain the material necessary for continued abundant fruiting.

The assumption that the lack of moisture is the source of difficulty, it is hard to see why the vine should do best just at the time when its roots have not yet penetrated deeply into the soil. Under the scanty rainfall of the upper San Joaquin valley it might be supposed that the plant begins to suffer whenever its roots reach beyond the depth to which the three or four inches of rainfall moisten the dry valley deposits. But where an average of ten or twelve inches falls, moisture is usually found at the depth of a few feet, increasing as we descend. If this is otherwise in mesa lands in question, it has not heretofore been reported. In any case, before giving up the mesas as grape lands, the effect of the proper fertilizers should be tried. Let one experimental patch receive a dressing of superphosphate fertilizer, another one of Chile saltpeter or ammonia manure, and still another a mixture of the two, all well and deeply worked in before the cessation of the rains in spring; the phosphate preferably as soon as the rains begin, in autumn. The result of these experiments would, perhaps, in a single season, settle the problem with such a degree of probability as to leave little doubt as to what can be done in the premises.

The question is of such wide importance to southern California as to deserve the attention not only of individuals, but of communities or societies. Let not the old cry that "manuring is too troublesome and will never pay," disturb those interested in the outcome; for the time when manuring will and must pay, or agriculture go to the wall, is not far off, even in California.

*Examination of soil from Ontario colony, collected by Mr. C. H. Dwinelle, at the head of Euclid avenue. Ontario occupies part of the slope at the base of Cucamonga mountain, and originally formed part of the rancho of that name. It adjoins on the west the well-known*



Cucamonga vineyard. Euclid avenue is the central thoroughfare of the colony, rising for six miles from 950 feet at its southern end to 2,200 feet at the northern, where it terminates against the foothills. The soil specimen examined is taken near the foothill slope, and therefore represents in a measure the debris and "wash" of these hills. It is noted that this soil, of which a belt runs along the foothills and part of the way down the slope is sufficiently moist through the season to grow trees and vines with little or no irrigation—a circumstance doubtless due, in part, at least, to the observed greater rainfall, as compared with the lower portions of the tract, but probably also influenced by the seepage from the hills.

Unlike the usual mesa soils of the southern region, this soil is of a blackish gray tint, due, as will be seen, to an unusually high percentage of humus. The surface soil to the depth of six inches is quite sandy and full of herbaceous roots, denoting a vigorous vegetation, and glistens with mica scales. Lower down it becomes more compact, and at the same time shows an increasing amount of rock fragments, and so continues, until at the depth of five feet the latter form quite half, or more, of its mass, the finer portion remaining, however, of nearly the same dark grayish tint as at one foot depth. The rock fragments, all angular, consist mostly of schistose material, largely gneissoid. The analysis of the soil, taken to twelve inches depth, resulted as follows:

#### Soil from Ontario Colony.

Fine Earth.....	53.2 per cent.
Stones and Coarse Sand.....	46.8

#### ANALYSIS OF FINE EARTH.

Insoluble Matter.....	43.50	} 66.54
Soluble Silica.....	23.04	
Potash.....		1.58
Soda.....		.43
Lime.....		2.77
Magnesia.....		2.87
Br. Oxide of Manganese.....		.06
Peroxide of Iron.....		5.58
Alumina.....		14.20
Phosphoric Acid.....		.09
Sulphuric Acid.....		.04
Water and Organic Matter.....		5.53

Humus.....	90.68
Available Inorganic.....	1.29
Hygroscopic Moisture.....	.42
Absorbed at.....°C.....	4.44
	12.00

From its composition this soil would naturally be conjectured to be that of a *ciénega*. Its potash percentage is extraordinary, exceeding that of any other California soil thus far examined; and with its relatively high amount of soda, would arouse a suspicion of "alkali," if that were possible in a location and soil naturally so well drained. The extraordinary percentage of "soluble silica" explains the seeming anomaly, in suggesting the innocuous combination in which these substances doubtless exist.

The lime and magnesia percentages are very high, as is, for that region, the item of humus; and that of phosphoric acid, while it would not generally be considered high, is so at least in comparison with other mesa soils of southern regions. Considering, in addition, its depth, this soil should be extremely productive—almost too much so for the production of high quality wine grapes, but well adapted to that of raisins as well as of olives, and doubtless, from its location, to that of citrus fruits; all of which should in such a soil, require only one or two good winter irrigations to secure both quantity and quality.—E. W. HILGARD.